

SECTION 02314

**EXCAVATION, BACKFILL AND FILL FOR
STRUCTURAL FACILITY AND UTILITY SYSTEMS**

PART 1 - GENERAL

1.01 SCOPE OF WORK:

- A. The work included under this Section consists of furnishing material and equipment, and performing all labor necessary for excavating, backfilling, filling and compaction of areas to be occupied by facilities or utility systems to be constructed.
- B. Plan For Excavation: Prior to commencing the excavation, the Contractor shall submit a plan of his proposed operations to the Engineer of Record for approval. The Contractor shall consider, and his plan for excavation shall reflect, existing utilities that are to remain, the equipment and methods to be employed in the excavation.

1.02 QUALITY ASSURANCE

All excavations shall conform with South Florida Building Codes, the State of Florida Trench Safety Act, OSHA requirements and the provisions herein. Excavations shall be executed in accordance with all applicable requirements of Section 01016, including notification of Sunshine State One-Call Center (1-800-432-4770) 48 hours prior to any excavation.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Structural Fill: Structural fill shall consist of an inorganic, non-plastic, granular soil containing less than 10 percent material passing the No.200 mesh sieve (relatively clean sand or crushed limerock with a 2-inch max. particle size) with a Unified Soil Classification of GP, GW, SP, SP-GM, SW-SM or SP-SM.
- B. Ballast Rock: Ballast rock shall be composed of hard, durable, sound pieces having a specific gravity of not less than 2.65. It shall be crushed rock conforming to the following gradation:

<u>U.S. Standard sieve size</u>	<u>Percent by weight passing</u>
1-1/2 inch	100
3/4 inch	30-75
1/2 inch	15-55
1/4 inch	0-5

- C. Suitable Backfill Material: Backfill material shall be clean and free from all organic material, clay, marl or unstable materials, debris, lumps, or broken paving. No rocks or stones larger than 6 inches in diameter shall be allowed in any backfill. Material for backfill may be material resulting from excavation, if suitable in the opinion of the Department.

- D. **Select Backfill Material:** Select backfill material specified herein shall meet all the general requirements for backfill material set forth above, and in addition, shall be free of any rocks or stones larger than 2 inches in diameter. Select backfill material may be material resulting from trench excavation, if suitable in the opinion of the Department, carefully selected to comply with these requirements.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. **Clearing:** The construction site shall be cleared of all obstructions and vegetation, including large roots and undergrowth, within 5 feet of the lines of excavation, in accordance with Section 02230. All debris created by this clearing operation shall be hauled from the site and disposed of by the Contractor.
- B. **Removals:** Complete all removals within the lines of excavation prior to beginning excavation. Where required, all existing shrubbery, trees, grass, sprinklers, fences signs, mailboxes, structures, sidewalks, curbs, utility poles, or structures subject to damage resulting from the excavation should be transplanted, relocated, braced, shored, or otherwise protected and preserved.

3.02 EXCAVATION

- A. The Contractor shall perform all excavation of every description and of whatever substances encountered, to the dimensions and depths shown on the approved plans, but in all cases as required for construction, and as specified herein. All excavations shall be made by open cut.
- B. When the walls of the excavations are to be kept vertical and in order to protect the safety of workmen, the general public, this or other work or structures, or excavation walls, or pipe installation including materials encountered in the excavation which have a tendency to slough or flow into the excavation, undermine the banks, weaken the overlying strata, or are otherwise rendered unstable by the excavation operation shall be retained by steel sheeting, stabilization, grouting or approved methods. Said methods shall comply with the Trench Safety Act (TSA). Sheeting and shoring or other approved method shall be designed by a Professional Engineer licensed to practice in the State of Florida.
- C. For structures, the Contractor shall maintain the bottom of the excavation firm and dry, and maintain an elevation of the water one (1) foot below the concrete to be placed, by use of pumps, tremie or other acceptable method.
- D. In areas where trench widths are not limited by right-of-way or easement widths, property line restrictions, existing adjacent improvements including pavements, structures, and other utilities, and maintenance of traffic, the trench sides may be sloped to a suitable angle of repose of the excavated material.
- E. Ladders or steps shall be provided for and used by workmen to enter and leave trenches.

- F. Excavated material shall be stored and disposed of in such a manner that they will not interfere unduly with traffic on public streets and sidewalks. In congested areas, such materials, cannot be stored adjacent to the trench nor used immediately as backfill, shall be removed to convenient places of storage. If any material is creating a public hazard or other unsafe condition, it shall be removed immediately to a storage area.
- G. Materials suitable for use as backfill be hauled to and used in areas where not enough suitable material is available from the excavation. Material unsuitable for use in backfill shall be removed promptly and disposed of by the Contractor. Any pockets of organic matter, concrete or other unsuitable material encountered in excavating shall be removed and replaced with material satisfactory to the Department.
- H. The excavation of walls for forms will not be permitted.
- I. Excavation for structures:
 - 1. Clear, as stated above, all existing items or structures in the way of the proposed pipeline or structures, and excavate as necessary to the depths and dimensions shown on the Plans, but in all cases as necessary for satisfactory installation.
 - 2. Where pavements or sidewalks are cut, they shall be cut by means of a mechanical pavement saw to form true and straight edges which shall, in general, be either parallel or at right angles.
 - 3. In order to protect himself from being held liable for any existing damaged pavement, including detour routes, the Contractor is advised to notify in writing the authority having jurisdiction over the street where such defective pavement exists prior to proceeding with any work in the vicinity. A copy of all such notices shall be forwarded to the Department.
 - 4. Where interlocking steel sheeting is used, the Department may require that the sheeting be cut off at a level two (2) feet above the top of the installed pipe and that portion below the level be left in place.
 - 5. Excavation for manholes and other piping appurtenances shall be sufficient to leave at least two (2) feet clear between their outer surfaces and the embankment or sheeting.
 - 6. If, in the opinion of the Engineer of Record or the Department, the soil at that depth is unsatisfactory as foundation material because it contains marl, muck, organic matter, or other unsuitable material, the excavation shall be continued two (2) feet deeper, except if a suitable foundation material is exposed at a lesser depth, further excavation will not be required.
 - 7. When the pipe to be installed in a trench requires the pipe installers to work under and around the pipe, the Contractor may request the Department that he be allowed to exceed the 12" maximum clearance, specifying the clear distance desired.
 - 8. The ends of existing mains shall be temporarily capped or plugged to keep them clean and the ends of all mains shall be temporarily anchored to keep the joints from blowing apart from internal pressure until the new mains can be reconnected to them.

9. In addition to specific construction methods specified, the general requirements in subsequent subsections, below, shall apply to the work of this project.

3.03 DEWATERING

- A. Any water which accumulates in the excavations for structures shall be removed promptly by means satisfactory to the Engineer of Record in such a manner as to not create a nuisance to adjacent property or public thoroughfare. Pumps and engines for dewatering systems shall be operated with mufflers and at a minimum noise level suitable to a residential area. The Contractor shall be responsible for any nuisance created due to the disposal of the water from his drainage system.
- B. Where applicable, the Contractor shall be required to obtain all necessary permits approving the location and proposed method of disposal before discharging water from any excavation into any portion of the public right-of-way or into any existing drainage structure or facility.

3.04 STOCKPILED MATERIALS

Suitable materials removed from the excavation shall be stored and disposed of in a manner which will not interfere with traffic at the site. Material suitable for backfill and not needed for backfill at the structure, but needed elsewhere shall be stockpiled until moved and used elsewhere.

3.05 BACKFILL

- A. The excavation shall then be brought to the structures bottom elevation by placing and compacting 6-inch layers of Oolitic limerock (or material previously defined) to 95 percent of maximum density as determined by AASTHO T-180. Structural fill shall be supplied by the Contractor except as may otherwise be carefully selected from excavated material if deemed suitable in the opinion of the Engineer. Backfill around new structures up to the pavement base or surface of the ground shall be material not exceeding 6-inches in diameter, and shall be compacted in layers not exceeding 9 inches. Each layer shall be compacted with a powered hand tamper, or other approved method to at least 98% of maximum density as determined by AASHTO T-180
- B. Backfill for precast manholes shall be drainfield limerock or specified pipe bedding material to a level to receive the manhole at the proper elevation.

END OF SECTION